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(54) Abstract Title
Feedback-Controlled Selective Signalling

(57) First and second data items are transmitted to a mobile user agent (eg a mobile phone) from a fixed station. The user agent may request the data items in response to a WAP push process conveyed by a message service signal. The data items may be delivered by means of http, in which case the data will be stored in the user agent cache, or by means of a message service message, in which case the data items will be part of the message. The second data item may then be provided by another source to the fixed station, which subsequently causes the user agent to delete its copies of first and second data items. Such a source may be a point of sale device (POS) in a shop, which scans the data items provided by the user agent, the data items representing a particular retail offer, the details of the offer being considered by the POS prior to the fixed station being notified of the execution of the offer.

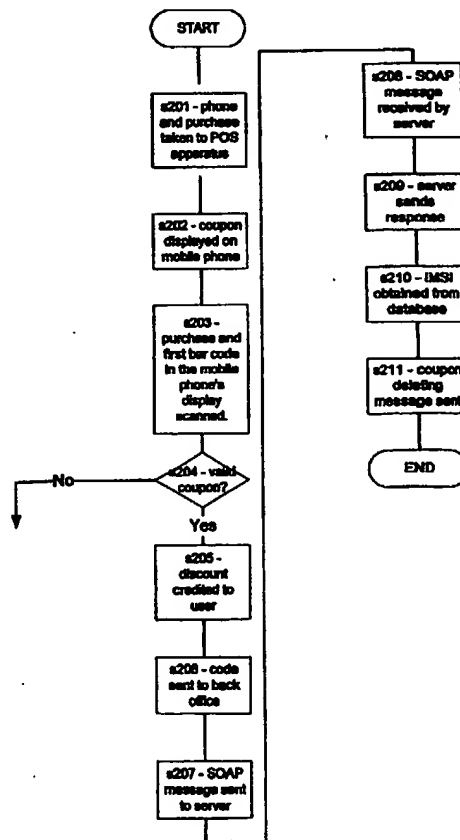


Figure 7

GB 2 379 052 A

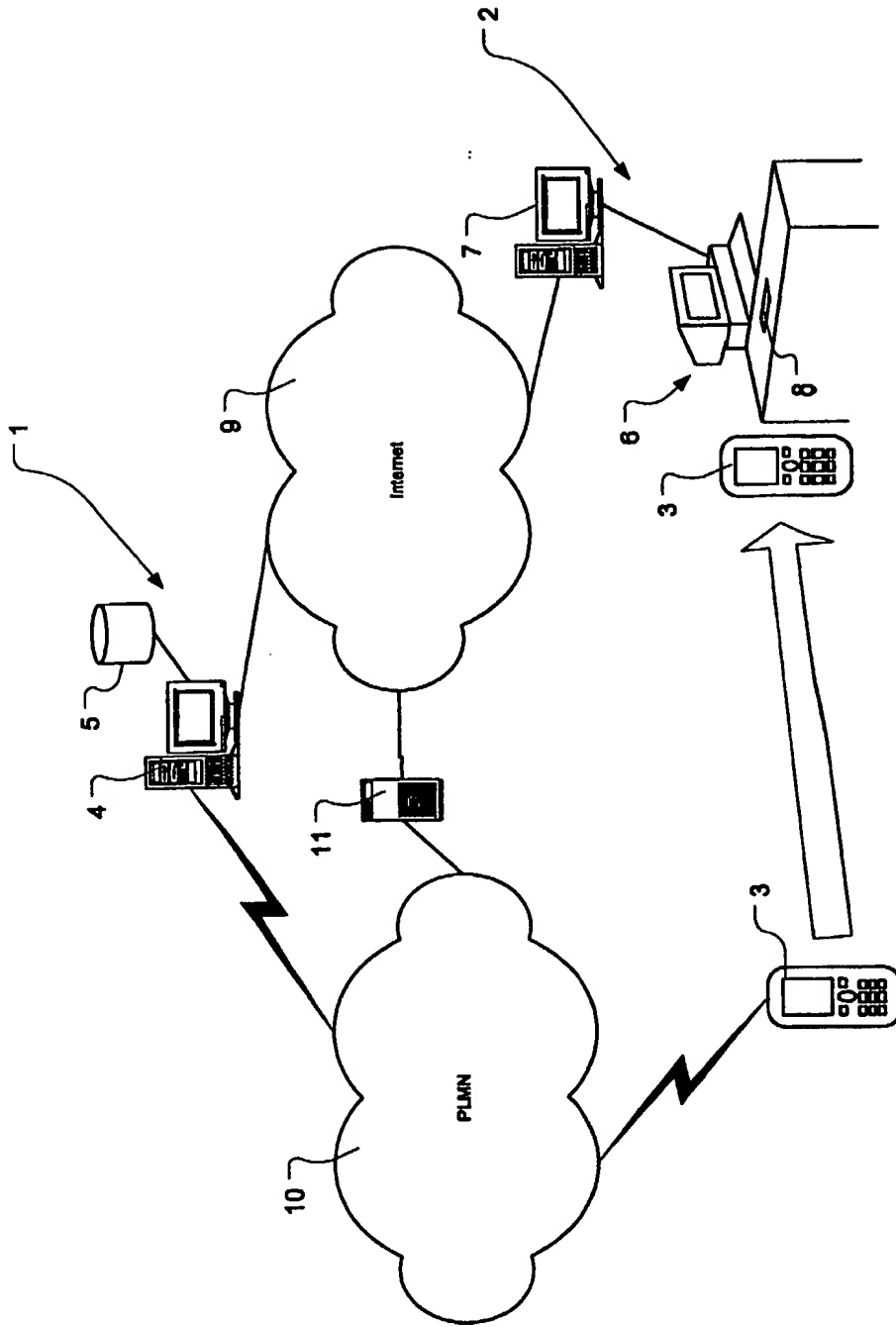


Figure 1

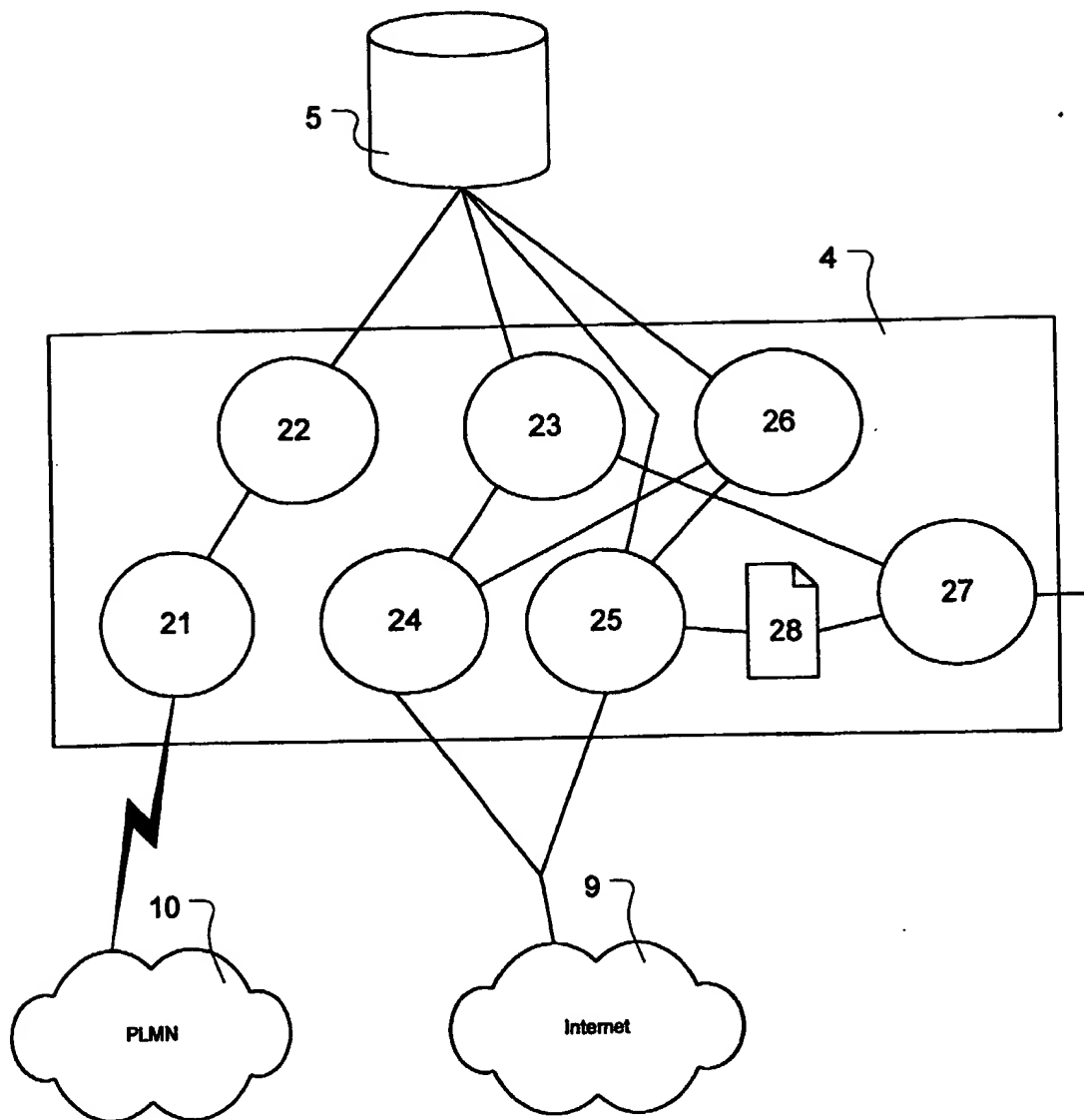


Figure 2

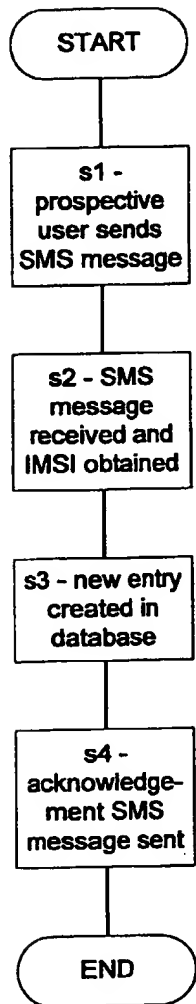


Figure 3

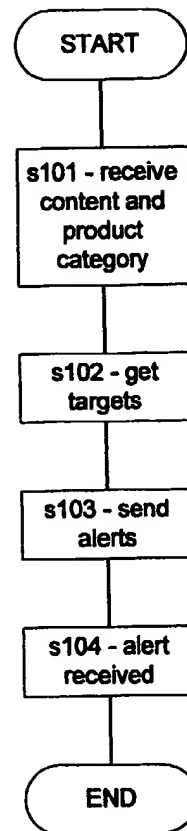


Figure 4

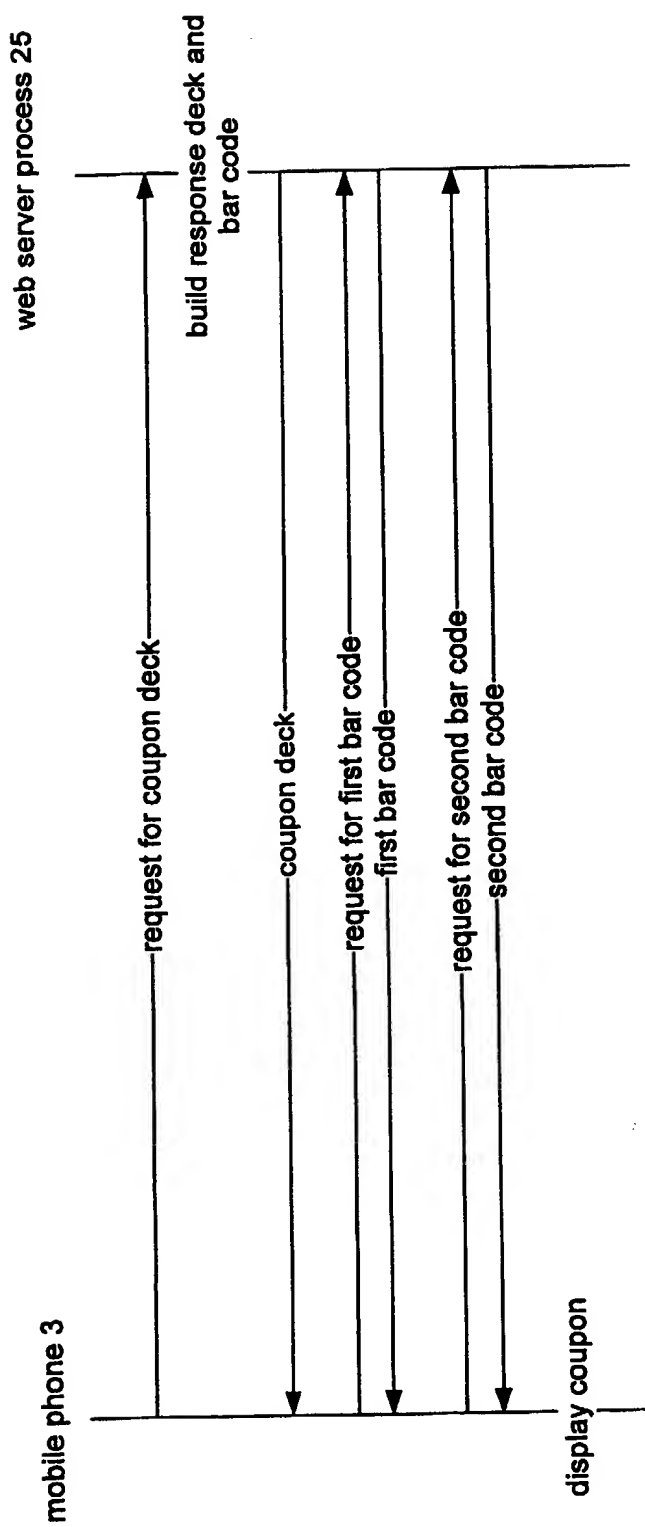


Figure 5

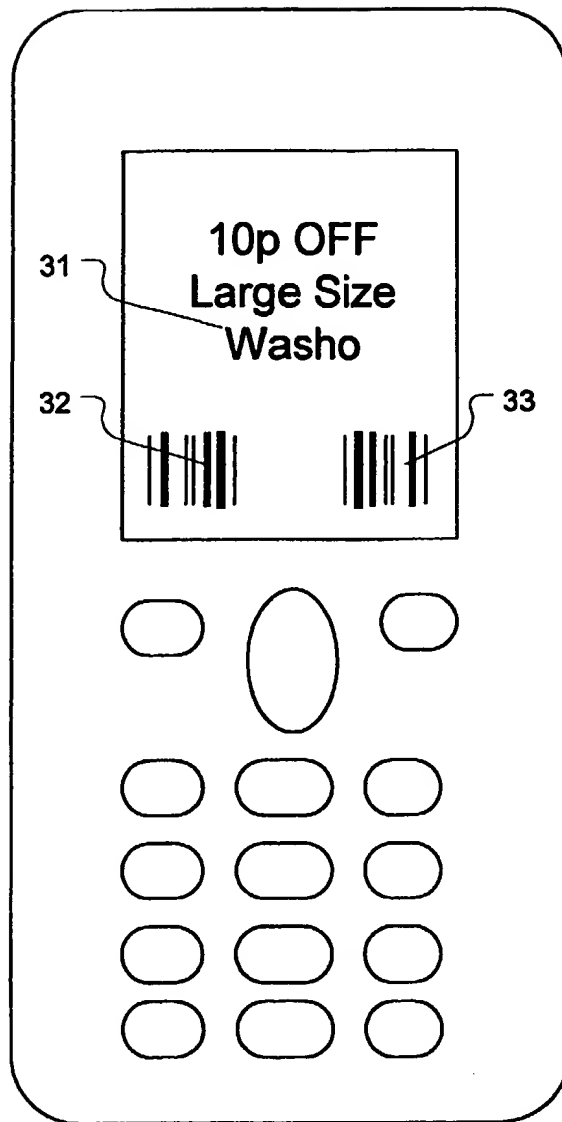


Figure 6

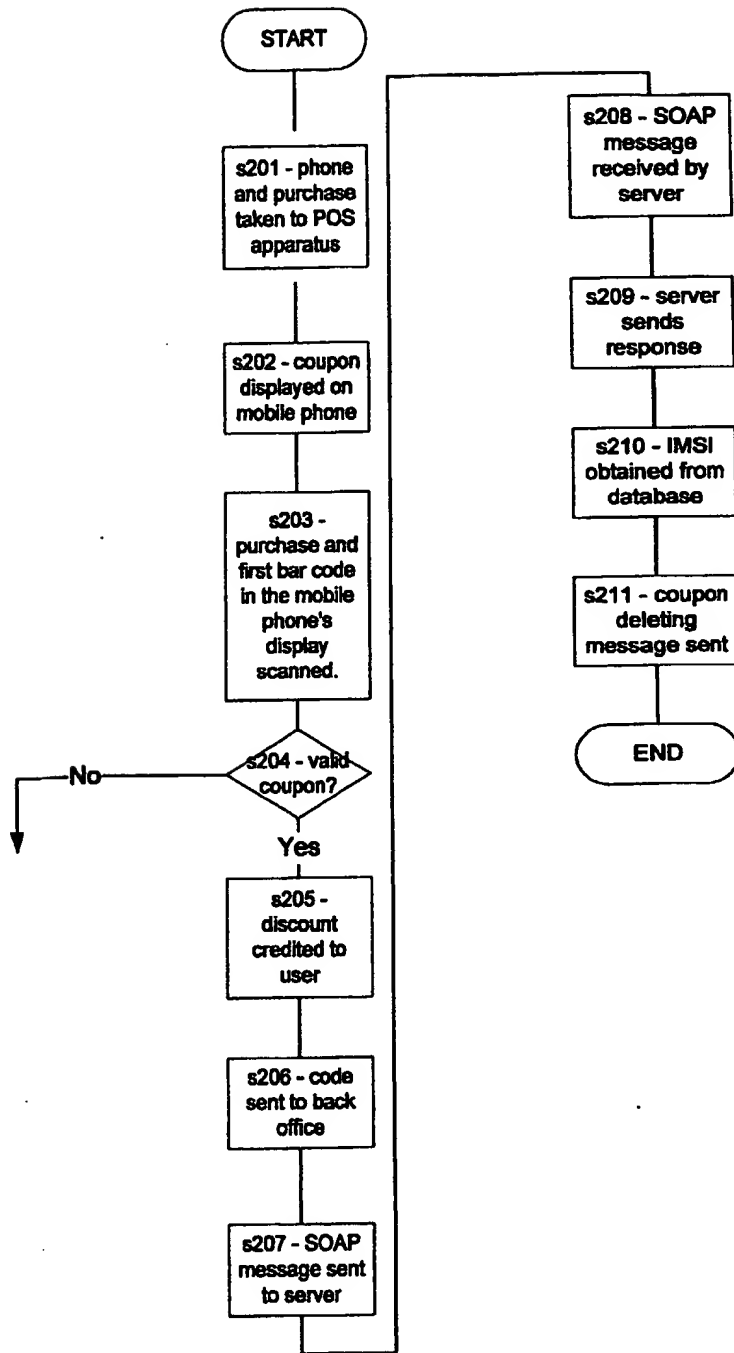


Figure 7

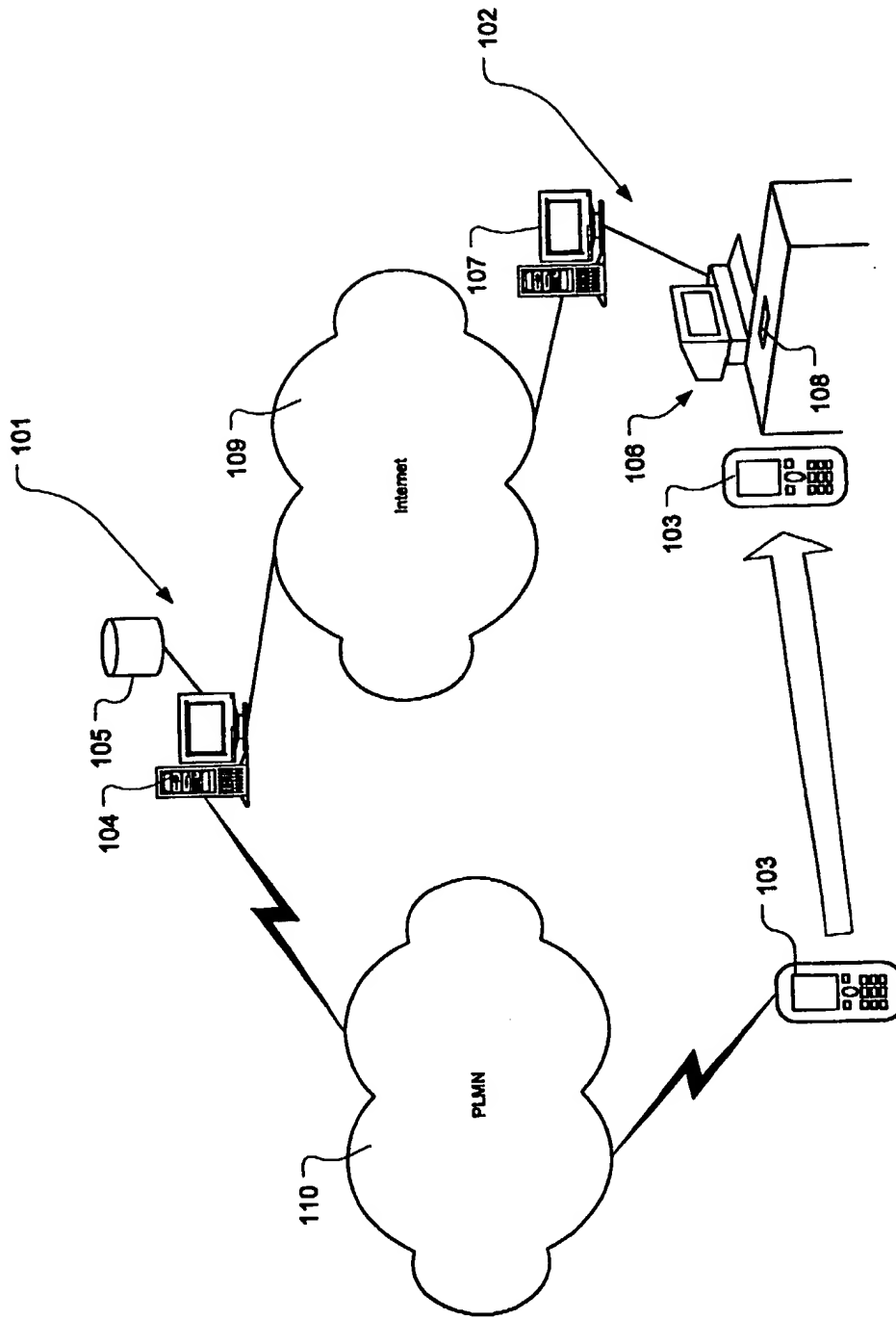


Figure 8

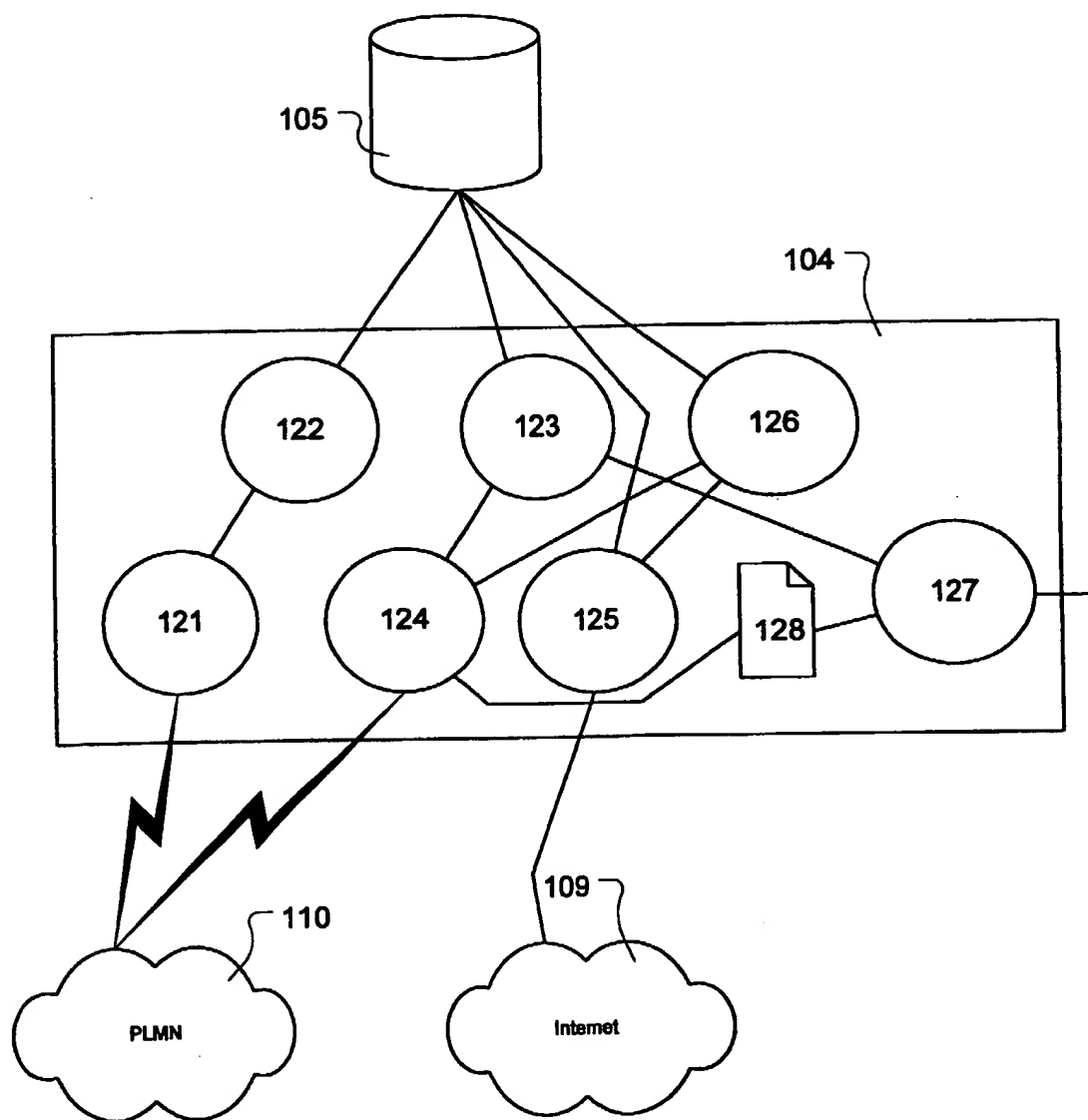


Figure 9

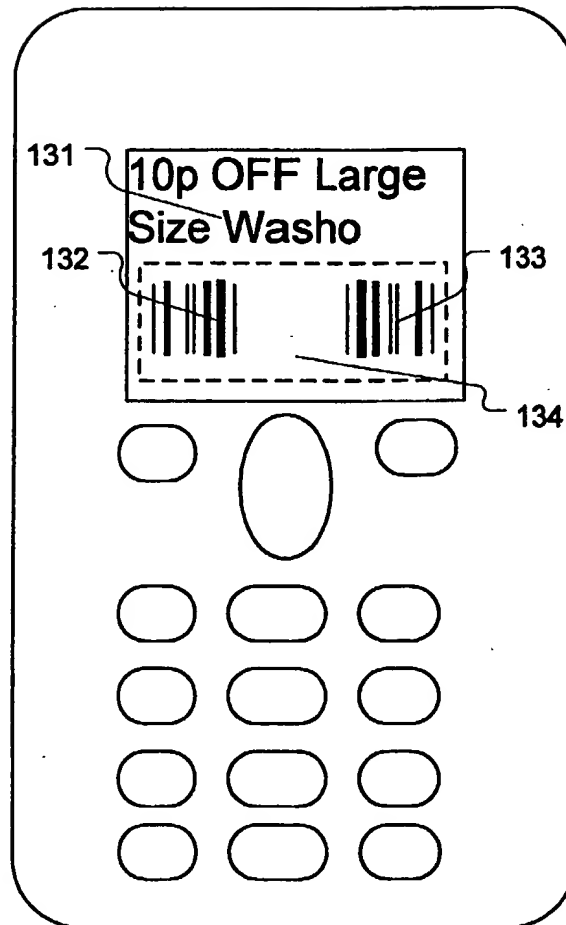


Figure 10

Feedback-Controlled Selective Signalling

Description

The present invention relates to a feedback controlled selective signalling system.

5

It has been proposed to use a selective signalling system, for example GSM (Global System for Mobile communications) SMS (Short Message Service) signals, to communicate an entitlement such as a coupon or a ticket, to a person.

10 According to the present invention, a method of feedback-controlled selective signalling comprising:-

transmitting first and second data items to a target mobile user agent from a fixed station;

storing a copy of said data items in said user agent;

15 transmitting said first and second data items from said user agent to an intermediate station;

transmitting said second data item from the intermediate station to said fixed station; and

20 at the fixed station, responding to reception of said second data item to signal said user agent selectively with a control signal configured to cause said user agent to delete said copy of said data items.

The first and second data items may be represented by a single code or separate codes.

25

Preferably, the transmission of said data items to the intermediate station is effected by scanning one or more bar codes displayed by the user agent.

30 Preferably, the transmission of said data item to the mobile agent is recorded in a database. This information can be used to prevent the data items being transmitted more than once or some other predetermined number of times.

An alert signal may be transmitted to the user agent, e.g. using a WAP push process, and the alert signal includes means for causing the user agent to request said data items from the fixed station. The alert may be conveyed by a message service signal.

5

The data items may be transmitted to the user agent in response to a request, such as an http request, therefor from the user agent, in which case said data items may be stored in the cache of a browser program of the user agent. Alternatively, the data items may be sent in a message service message, for example an SMS picture message. The signal configured to cause the user agent to delete the stored copy of the data items may comprise a cache clear command for causing the browser program to clear said copy from its cache or a message service message delete message. The delete message need not be sent until the second data item has been received a plurality of times. The threshold for deletion may be predetermined or dependent on some changing factor, e.g. time.

15

According to the present invention, there is provided an apparatus for feedback-controlled selective signalling, the apparatus comprising:-

means for transmitting first and second data items to a target mobile user agent.

20

means responsive to reception of said second data item, from a source other than said target mobile user agent, to signal said user agent selectively with a control signal configured to cause said user agent to delete said copy of said data items.

The first and second data items may be represented by a single code or separate codes, which may be represented by images of bar codes.

25

A database and means for recording the transmission of said data items to the mobile agent in the database may be included.

30

Means may be provided for transmitting an alert signal, e.g. by a WAP push process which may use a message service as its transport, to said target user agent, the alert signal including means for causing the user agent to request said data items.

The data items may be transmitted to the user agent in response to a request, such as an http request, therefor from the user agent, in which case said data items may be stored in the cache of a browser program of the user agent. Alternatively, the
5 data items may be sent in a message service message, for example an SMS picture message. The signal configured to cause the user agent to delete the stored copy of the data items may comprise a cache clear command for causing the browser program to clear said copy from its cache or a message service message delete message.

10

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows the major components of a first embodiment of the present invention;

15 Figure 2 is a block diagram of the administrative centre of Figure 1;

Figure 3 is a flowchart illustrating the registration of a user;

Figure 4 is a flowchart illustrating the issuing of a coupon;

Figure 5 is a signalling diagram illustrating the first viewing of a coupon;

Figure 6 shows a mobile phone displaying a "coupon";

20 Figure 7 is a flowchart illustrating the redemption of a coupon;

Figure 8 shows the major components of a second embodiment of the present invention;

Figure 9 is a block diagram of the administrative centre of Figure 8; and

Figure 10 shows a mobile phone displaying a "coupon".

25

First Embodiment

Referring to Figure 1, a first system according to the present invention comprises an administrative centre 1, a supermarket 2 and a mobile phone 3. The administrative centre 1 comprises a server computer system 4 and a database 5. The supermarket 2
30 has a sales and inventory management system including a POS (Point Of Sale) apparatus 6 and a back office computer system 7. The POS apparatus 6 includes a bar code scanner 8. The mobile phone 3 supports the reception of pushed WAP messages.

The back office computer system 7 and the administrative centre 1 are connected by the Internet 9 and a link via a push proxy gateway 11 is provided between the Internet 9 and a mobile phone network 10 for WAP communication between the administrative centre 1 and the mobile phone 3. The administrative centre 1 also includes a GSM modem.

Referring to Figure 2, the server computer system 4, which may comprise one or more machines, supports an SMS handling process 21, a user registration process 22, a target selection process 23, a WAP push process 24, a web server process 25, a feedback handling process 26 and a content receiving process 27 for receiving content 28.

The operation of the above-described embodiment of the present invention will now be described in the context of the provision and redemption of electronic discount coupons.

Referring to Figure 3, in order to become eligible to receive electronic discount coupons, the user of the mobile phone 3 sends a blank SMS message to the administrative centre 1 (step s1). The SMS handling process 21 detects the SMS message and obtains the sender's IMSI from the message (step s2). The sender's IMSI is then passed to the user registration process 25 which creates a new entry in the database 5 for the new user (step s3). No more specific information about the user is requested or stored in the database 5. The user registration process 25 reports the adding of the new user's IMSI to the database 5 to the SMS handling process 21 which sends a confirmation message back to the new user (step s4).

Referring to Figure 4, when an entity, for instance a manufacturer of a product available at the supermarket 2, wishes to make electronic discount coupons available to users, the entity provides content 28 and product category information to the server computer system 4 via the content receiving process 27 (step s101). The content receiving process may be an FTP server, a web server or even a content creation program such as a WML authoring tool. The received content comprises a

WML (Wireless Markup Language) deck, including at least one card, and a bar code image file. In the present embodiment, the deck includes a card that includes a link to the bar code image file and a link to a dynamic bar code resource which will be described below.

5

After receiving the content 28 and the product category, the content receiving process 27 communicates the product category information to the target selection process 23. The target selection process 23 then queries the database 5 to obtain a list of IMSIs (step s102). The query is adapted to obtain the IMSIs of relatively new
10 users and more long term users who have a history of interest in the product category or categories identified by the product category information.

The WAP push process 24 receives the list of targets from the target selection process 23 and sends a WAP alert to each target via the push proxy gateway 11
15 using the IMSIs as the device addresses (step s103). The push proxy gateway 11 uses SMS as the transport for the WAP alerts. The WAP alerts include a service indicator including the URL of a WML deck available from the web server process 25. The URL has the target's IMSI encoded in it.

20 When a WAP alert is received by a mobile phone 3, the mobile phone 3 displays a prompt asking the user whether the user wishes to view the service (step s104). The user may decide to view the service or skip it and view it later.

Referring to Figure 5, when the user decides to view the service, the mobile phone's
25 WAP browser sends a request for the service to the web server process 25, via a WAP gateway (not shown). The web server process 25 extracts the IMSI from the URL, queries the database 5 to determine whether the associated user has already used the coupon, and, if the coupon has not been redeemed by the associated user and has not time-expired, generates a code value and stores the code value in the
30 database 5 with references to the user, i.e. IMSI, requesting the service and the coupon provided by the service. The web server process 25 then generates a wbmp file containing a bar code representing the code value and stores it. Finally, the web server process 25 inserts a reference to the URL of the new bar code wbmp file into

the deck, provided by the entity issuing the coupons, and sends the amended deck to the mobile phone 3. If the associated user has redeemed the coupon, an alternative deck notifying the user that coupon is no longer available is sent instead.

5 The mobile phone's WAP browser receives the deck and requests the bar codes' image files referenced in the deck and displays the result. The deck is also cached for later redisplay. The web server process deletes the new bar code file once it has been sent. Alternatively, the creation of the new bar code could be deferred until it is requested, thereby avoiding the need to store it temporarily.

10

Referring to Figure 6, the displayed page contains text or an image 31 identifying the product and discount to which the coupon relates, a first bar code 32 for identifying the discount to the POS apparatus 6 and a second bar code 33, which the web server process 25 produced.

15

Referring to Figure 7, when the user wishes to use the coupon, the user takes the product and the mobile phone 3 to the POS apparatus 6 (step s201). The user calls up the coupon from the WAP browser's cache so that it is displayed by the mobile phone 3 (step s202). After the bar code on the product has been scanned by the bar
20 code scanner 8, the user presents the mobile phone 3 so that the bar codes on its display can also be scanned (step s203).

The software of the POS apparatus 6 is largely conventional. However, the POS apparatus 6 is programmed to respond to bar code 32, 33. In response to the
25 second bar code 33 being valid (step s204), e.g. the relevant product, identified by the first bar code 32, being purchased, the POS apparatus 6 credits the user's bill with the value of the coupon (step s205). If the corresponding product has not been scanned the coupon is rejected. If the coupon is not rejected, the coded value from the second bar code 33 is sent to the back office system 7 (step s206). The
30 back office system 7 then sends a SOAP message, containing the coded value, to the web server process 25 (s207). The user then completes his/her purchase in the usual manner.

When the web server process 25 receives the SOAP message (step s208), it sends an acknowledgement back to the back office system 7 (step s209) and passes the SOAP message to the feedback handling process 26. The feedback handling process 26 queries the database 5 to obtain the IMSI of the mobile phone 3 used to redeem the coupon (step s210). When the IMSI has been obtained, the feedback handling process 26 records the use of the coupon, and the associated product category, in the database 5 and instructs the WAP push process 24 to send a cache clear message to the mobile phone 3 to clear the coupon from the cache of the mobile phone's WAP browser so that the user of the mobile phone 3 cannot use the coupon again (step s211).

The operator of the administrative centre 1 can determine the amount to be paid to the supermarket 2, to compensate it for the discounts, and the amount to be billed to the coupon issuer from the records of redeemed coupons in the database 5.

15

Second Embodiment

Referring to Figure 8, a second system according to the present invention comprises an administrative centre 101, a supermarket 102 and a mobile phone 103. The administrative centre 101 comprises a server computer system 104 and a database 105. The supermarket 102 has a sales and inventory management system including a POS (Point Of Sale) apparatus 106 and a back office computer system 107. The POS apparatus 106 includes a bar code scanner 108. The mobile phone 103 supports the reception of SMS picture messages.

25 The back office computer system 107 and the administrative centre 101 are connected by the Internet 109. The mobile phone 103 and the administrative centre 101 communicate via a mobile phone network 110. The administrative centre 1 also includes a GSM modem.

30 Referring to Figure 9, the server computer system 104, which may comprise one or more machines, supports an SMS receiving process 121, a user registration process 122, a target selection process 123, an SMS sending process 124, a web server

process 125, a feedback handling process 126 and a content receiving process 127 for receiving content 128.

The operation of the above-described embodiment of the present invention will
5 now be described in the context of the provision and redemption of electronic discount coupons.

Referring again to Figure 3, in order to become eligible to receive electronic discount coupons, the user of the mobile phone 103 sends a blank SMS message to
10 the administrative centre 101 (step s1). The SMS receiving process 121 detects the SMS message and obtains the sender's IMSI from the message (step s2). The sender's IMSI is then passed to the user registration process 125 which creates a new entry in the database 105 for the new user (step s3). No more specific information about the user is requested or stored in the database 105. The user
15 registration process reports the adding of the new user's IMSI to the database 105 to the SMS sending process 124 which sends a confirmation message back to the new user (step s4).

Referring again to Figure 4, when an entity, for instance a manufacturer of a
20 product available at the supermarket 102, wishes to make electronic discount coupons available to users, the entity provides content 128 and product category information to the server computer system 104 via the content receiving process 127 (step s101). The content receiving process may be an FTP server or a web server. The received content comprises a text message and a code. In the present
25 embodiment, the text message is "10p OFF Large Size Washo" and the code identifies indirectly the product and the discount.

After receiving the content 128 and the product category, the content receiving process 127 communicates the product category information to the target selection
30 process 123. The target selection process 123 then queries the database 105 to obtain a list of IMSIs (step s102). The query is adapted to obtain the IMSIs of relatively new users and more long term users who have a history of interest in the product category or categories identified by the product category information.

The SMS sending process 124 receives the list of targets from the target selection process 123 and sends an SMS message to each target (step s103). Each SMS message is a multipart message according to Smart Messaging Specification (18/12/2000 Nokia Mobile Phones Ltd.) comprising the text message and a picture. The picture is a bit map image of a two bar codes 132, 133 (see Figure 10) and is generated anew by the SMS sending process for each target. The first bar code 132 represents the code provided to the content receiving process 127 and the second bar code 133 identifies the target by means of corresponding entries in the database 105.

Referring to Figure 10, the displayed message contains message text 131 and an image 134 containing the first and second bar codes 132, 133.

Referring again to Figure 7, when the user wishes to use the coupon, the user takes the product and the mobile phone 103 to the POS apparatus 106 (step s201). The user calls up the coupon from the SMS message box in the mobile phone 103 so that it is displayed by the mobile phone 103 (step s202). After the bar code on the product has been scanned by the bar code scanner 108, the user presents the mobile phone 3 so that the bar codes on its display can also be scanned (step s203).

The software of the POS apparatus 106 is largely conventional. However, the POS apparatus 106 is programmed to respond to the second bar code 133. In response to the second bar code 133 being valid (step s204), e.g. the relevant product being purchased, the POS apparatus 106 credits the user's bill with the value of the coupon (step s205). If the corresponding product has not been scanned the coupon is rejected. If the coupon is not rejected, the coded value from the second bar code 133 is sent to the back office system 107 (step s206). The back office system 7 then sends a SOAP message, containing the coded value, to the web server process 125 (s207). The user then completes his/her purchase in the usual manner.

When the web server process 125 receives the SOAP message (step s208), it sends an acknowledgement back to the back office system 107 (step s209) and passes the

SOAP message to the feedback handling process 126. The feedback handling process 126 queries the database 105 to obtain the IMSI of the mobile phone 103, used to redeem the coupon (step s210). When the IMSI has been obtained, the feedback handling process 126 records the use of the coupon, and the associated product category, in the database 105 and instructs the SMS sending process 124 to send a message delete message to the mobile phone 103 to delete the coupon message so that the user of the mobile phone 103 cannot use the coupon again (step s211).

10 The message delete message may also be triggered by an expiry date for a coupon. Thus, when a coupon expires a corresponding message delete message is sent to all of the coupon recipients.

The role of the delete message may be performed by a replace message conveying a further coupon. In such a case, the SMS sending process 124 will defer sending coupons to a user, identified by the target selection process 123, until the feedback handling process 126 has reported that a user has redeemed a previous coupon or a predetermined period of time has elapsed.

20 The operator of the administrative centre 101 can determine the amount to be paid to the supermarket 102, to compensate it for the discounts, and the amount to be billed to the coupon issuer from the records of redeemed coupons in the database 105.

25 Although there are numerous bar code formats, the easiest to read is a format known as 'Code 3 of 9'. Within the family of 'Code 3 of 9' barcodes, tests have shown that a style known as 'Code 3 of 9 – medium' can be read with the least effort.

30 The bar codes sent as part of a coupon are preferably a 'Code 3 of 9 – medium' bar codes consisting of a total 16 digits, which may be contained in one bar code or the two described above. The 16 digit structure consists of three parts.

The first four digits identify the promotion. The second two digits relate to locations where the coupon can be redeemed. The last ten digits, which form the second bar code where two are used, will contain the last ten digits of the IMSI of the mobile phone to which the coupon has been sent.

5

It will be appreciated that many modifications may be made to the above described embodiment. In particular, different transports may be employed for various messages. Furthermore, the two bar codes may be replaced by some other form of visible code or a wireless data transfer, e.g. using Bluetooth, and the two codes may
10 be replaced by a single code having the same information content.

The administrative centres may themselves comprise a plurality of networked computers. In the foregoing description, reference has been made to various processes of the administrative centres. It is to be understood that the term
15 "process" is used herein to identify the functional elements of the administrative centres rather than in the formal sense employed by computer scientists. The various processes may be performed by different programs or by aspect of one program. For instance, if each function is performed by methods of corresponding software objects, the objects could be combined in one executable or could be
20 relatively standalone items communicating via COM, CORBA, SOAP or XML-RPC.

Claims

1. A method of feedback controlled selective signalling comprising:-
transmitting first and second data items to a target mobile user agent from a
5 fixed station;
storing a copy of said data items in said user agent;
transmitting said first and second data items from said user agent to an
intermediate station;
transmitting said second data item from the intermediate station to said fixed
10 station; and
at the fixed station, responding to reception of said second data item to
signal said user agent selectively with a control signal configured to cause said user
agent to delete said copy of said data items.
- 15 2. A method according to claim 1, wherein said first and second data items are
comprised in a single code.
3. A method according to claim 1 or 2, wherein the transmission of said data
items to the intermediate station is effected by scanning one or more bar codes
20 displayed by the user agent.
4. A method according to claim 1, 2 or 3, including recording the transmission
of said data items to the mobile agent in a database.
- 25 5. A method according to any preceding claim, including transmitting an alert
signal to the user agent, the alert signal including means for causing the user agent
to request said data items from the fixed station.
6. A method according to claim 5, wherein the alert signal is transmitted using a
30 WAP push process.
7. A method according to claim 4 or 5, wherein the alert is conveyed by a
message service signal.

8. A method according to any preceding claim, wherein said data items are transmitted to the user agent in response to a request therefor from the user agent.

5 9. A method according to claim 8, wherein said request comprises an http request signal.

10. A method according to claim 8 or 9, wherein said data items are stored in the cache of a browser program of the user agent.

10

11. A method according to claim 10, wherein said signal configured to cause the user agent to delete the stored copy of the data items comprises a cache clear ... command for causing the browser program to clear said copy from its cache.

15 12. A method according to claim 9, wherein it is checked that said data items have not be sent to said user agent before transmission of said data items to the user agent from the fixed station.

20 13. A method according to claim 4, wherein the database is queried to check that said data items have not be sent to said user agent before transmission of said data items to the user agent from the fixed station.

14. A method according to claim any one of claims 1 to 4 and 13, wherein said data items are transmitted to said user agent in a message service message.

25

15. A method according to claim 14, wherein said control signal is a message delete signal of a message service.

30 16. An apparatus for feedback-controlled selective signalling, the apparatus comprising:-
means for transmitting first and second data items to a target mobile user agent;

means responsive to reception of said second data item, from a source other than said target mobile user agent, to signal said user agent selectively with a control signal configured to cause said user agent to delete said copy of said data items.

5 17. An apparatus according to claim 16, wherein said first and second data items are comprised in a single code.

18. An apparatus according to claim 16 or 17, wherein the first and second data items are represented by one or more images.

10

19. An apparatus according to claim 18, wherein said image or images are of one or more bar codes.

20. An apparatus according to any one of claims 16 to 19, including a database
15 and means for recording the transmission of said data items to the mobile agent in the database.

21. An apparatus according to any one of claims 16 to 20, including means for
transmitting an alert signal to said target user agent, the alert signal including means
20 for causing the user agent to request said data items.

22. An apparatus according to claim 21, wherein the means for transmitting an alert signal comprises a WAP push process.

25 23. An apparatus according to claim 21 or 22, wherein means for transmitting an alert signal is configured for sending alerts by message service signals.

24. An apparatus according to any one of claims 16 to 23, wherein the means for
transmitting first and second data items is configured for transmitting said data
30 items to the target user agent in response to a request therefor from the target user agent.

25. An apparatus according to claim 24, wherein means for transmitting first and second data items comprises a http server.

5 26. An apparatus according to claim 25, wherein said signal configured to cause the user agent to delete the stored copy of the data items comprises a cache clear command for causing a browser program to clear said copy from its cache.

10 27. An apparatus according to claim 24, wherein means for transmitting first and second data items is configured to check that said data items have not be sent to the target user agent before transmission of said data items to the target user agent.

28. An apparatus according to claim 20, wherein the means for transmitting first and second data items queries the database to check that said data items have not be sent to the target user agent before transmission of said data items to the user agent.

15

29. An apparatus according to claim any one of claims 16 to 20 and 28, wherein the means for transmitting first and second data items is configured to said data items are transmitted to the target user agent in a message service message.

20 30. An apparatus according to claim 29, wherein said control signal is a message delete signal of a message service.

31. A method of feedback-controlled selective signalling substantially as hereinbefore described.

25

32. An apparatus for feedback-controlled selective signalling substantially as hereinbefore described.



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Claims searched: 1-32

Examiner: Ben Buchanan
Date of search: 10 January 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

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|----------|--------------------|--|---|
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| X | 1 at least | WO 00/03328 A1 | MOTOROLA INC. (see whole document) |
| A | 1 at least | GB 2363219 A | OVATE LIMITED (see whole document) |
| A | 1 at least | US 6385591 B1 | MANKOFF (see whole document) |

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